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Bull. Natn. Sci. Mus., Tokyo, Ser. A, 7 (4), Dec. 22, 1981

Two New Species of the Squid Genus *Onykia* from the Tropical Indian Ocean (Cephalopoda, Onychoteuthidae)

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During the course of a study on oceanic cephalopods eaten by longnose lancetfish, *Alepisaurus ferox*, in the Tropical Indian and Pacific Oceans, two species of the genus *Onykia* LESUEUR, 1821, were found. As this genus has been monotypic, these two have hitherto been undescribed. One of them seems to be conspecific with a squid inadequately identified by myself (1968) and, subsequently, described (but given no name) by RANCUREL (1970). The other one is sympatric with the former.

I wish to express my gratitude to Mr. Kiyoshi FUJITA, Tokyo University of Fisheries, for his kind offer of extensive collection of *Alepisaurus* stomach contents at my disporsal. Thanks are also due to Mrs. Pauline DAYARANTHA, Department of Fisheries, Sri-Lanka, and Mr. Shin-ichi TSUKADA, Tokai University, for their help in sorting and measuring the specimens under study.

Onykia rancureli n. sp.

(Figs. 1–9)

Onychia carribaea: OKUTANI, 1968, p. 22, pl. 4, fig. 6 (non LESUEUR, 1821).
Onychia sp.: RANCUREL, 1970, p. 18, figs. 12–16.

Description. The body is muscular throughout. The mantle is rather short, with the width being almost half the dorsal mantle length, short cylindrical anteriorly and abruptly tapering behind. The dorso-anterior edge of the mantle forms a blunt triangular angle and a dark and slightly raised streak of the gladius runs along the mid-dorsum from the anterior end to the halfway point of the fin base. There is a shallow ventral excavation on the free mantle margin.

The fins are broad and never sagittate but semi-oval in outline. The posterior margin of both lobes exceeds beyond the level of the posterior extremity of the mantle. Fin length is about 45% and fin width about 100% of the dorsal mantle length, respectively.

The head is semi-cubic in shape with a moderate-sized funnel which reaches as far as the midpoint of the eye. The neck carries a small olfactory crest at the posterior edge of the broad and smooth funnel groove and another small fleshy crest at the antero-dorsal corner. The funnel element of the mantle-funnel locking apparatus is a simple leaf-shaped cartilage with a shallow longitudinal groove corresponding to a slender fleshy ridge of the mantle element. The dorsal element of the funnel organ is

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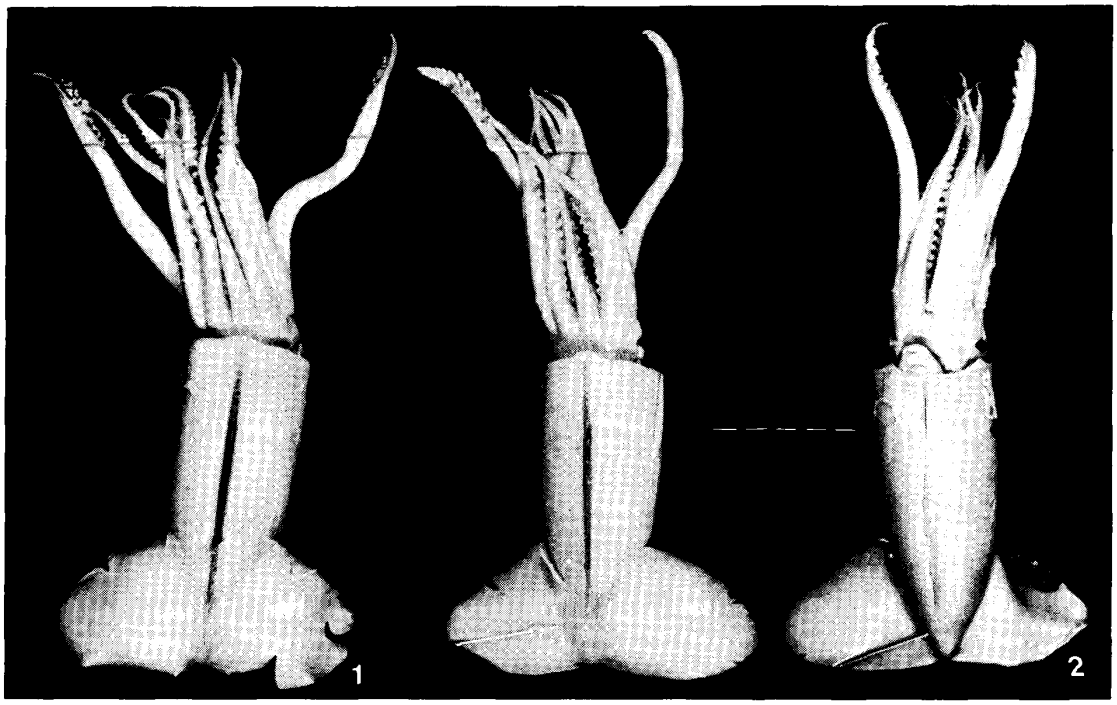

Figs. 1–2. *Onykia rancureli* n. sp. —— 1. Holotype specimen, dorsal view (DML=68.0 mm). —— 2. Paratype No. 2, dorasal and ventral views (DML=57.6 mm).

V-shaped, with round tipped rami on which a distinct ridge runs. There is no papilla at the apex. The nuchal cartilage is straight but moderately widened anteriorly and posteriorly. There is a shallow longitudinal groove running in the middle, which is margined by the ridge on both sides.

The eye-opening is rather small, quadrate in outline with a deep sinus. The eye-opening is frequently closed by a shrinkage of the muscle.

The arms are muscular and stout, armed by biserial suckers. The Arm I is slightly shorter than the others which are subequal in length. The Arm I is trapezoid in cross-section, without aboral keel but with a low undulating protective membrane on both sides of the sucker-bearing surface. There are some 50 suckers on the Arm I. The Arm II has a low aboral keel in its entire length. There is also a very low protective membrane on both sides of sucker-bearing surface where 50–52 suckers are present. The Arm III is very much alike the Arm II in general characters except a slight prominency of the aboral keel in comparison to that of the Arm II. The Arm IV also has an aboral keel which is broadly extended proximally forming a web covering the basal portion of the tentacular stalk. No hectocotylization was observed. The chitinous rings of all arms have no teeth along the internal margin.

The tentacle is rather short, only slightly longer than the longest arm. There is a low membraneous carina running along the aboral side of the stalk. This carina barely reaches to the club part. The club is slightly expanded with a protective membrane on the dorsal side extending from the midpoint of the club to the distal tip. The sucker-bearing part has distinct carpal group, manus and dactylus. The carpal

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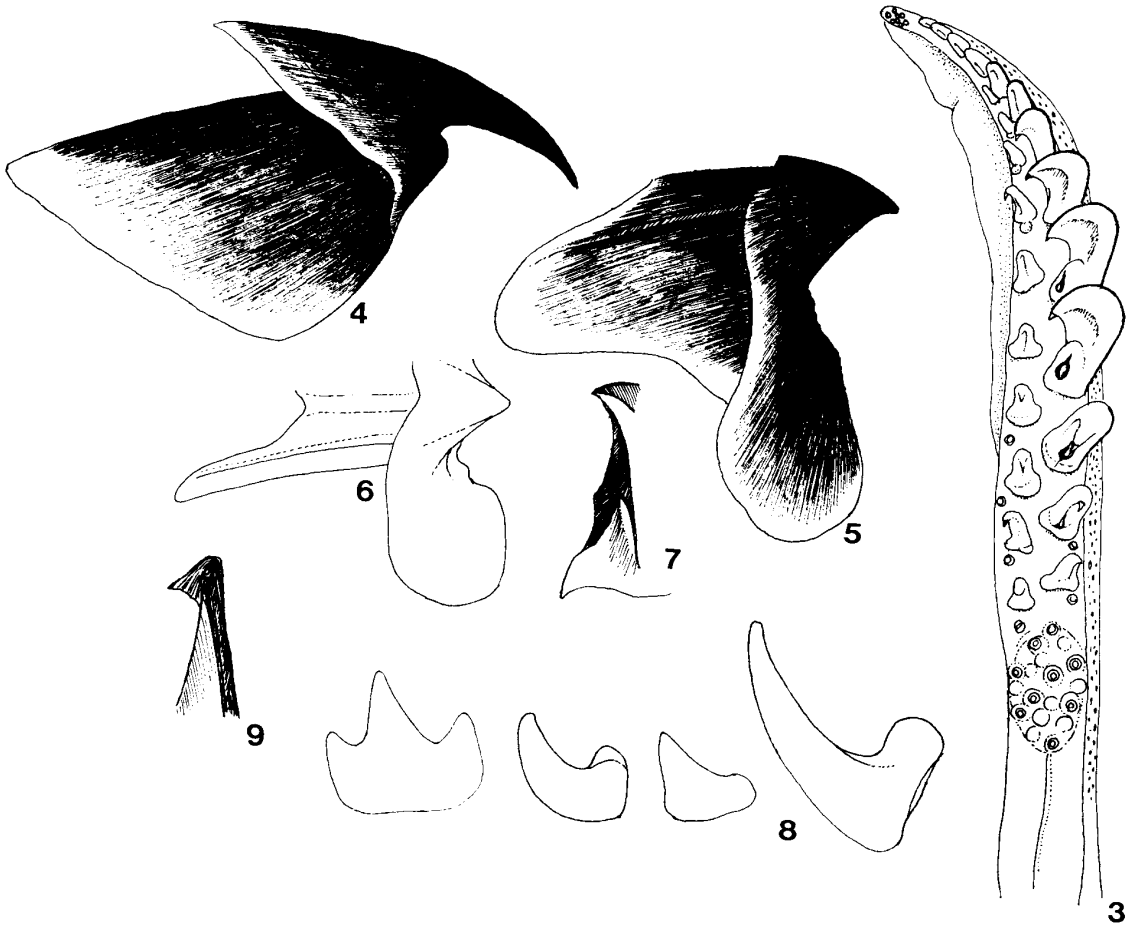

Figs. 3–9. *Onykia rancureli* n. sp. —— 3. Right tantacle club. —— 4. Upper jaw plate. —— 5. Lower jaw plate. —— 6. Outer view of the lower jaw plate. —— 7. Inner view of wing shoulder and fold of the lower jaw plate. —— 8. A transverse row of the radula. —— 9. End-cone of the gladius.

group is well defined as a fixing apparatus consisted of nine suckers and nine fleshy knobs. The armature of the manus is consisted of a double row of hooks, of which the ventral row is distinctly larger than the dorsal row. On the ventral row, there are 13 hooks among which the fourth and fifth from the proximal are largest of all. The dorsal row has 10 hooks of which medial ones are slightly stronger than the proximal and distal ones. The hooks are all basally covered with fleshy hood. There are very small suckers between proximal hooks one each per interval between hooks; two on the ventral side and four on the dorsal side. There are only even to nine small suckers in the well-defined dactylus. A very weak fleshy ridge runs from the proximal periphery of the fixing apparatus towards the base of the tentacle.

The buccal connnective attaches to the ventral side of the Arm IV (DDVV-type).

The gladius is lanceolate in general shape, widened at about posterior two-thirds of the length. The rhachis is rather wide and solid. The posterior end is slightly solidified with a minute cap-like structure.

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The upper jaw plate has a strong rostrum and triangular lateral wall which is mostly stained in amber color with transparent margin. The rostrum gently curves with an acute jaw angle. The hood is moderately apart from the crest at the posterior end. The lateral wall is not notched behind. The crest is rather narrow. The wing shoulder is sharp with an oblique profile in cross-section.

The lower jaw plate is typical onychoteuthid type. The rostrum has a sharply defined cutting edge with a usual degree of protrusion. The wing fold is moderately distinct as an obtuse jaw angle is hidden behind. There is a sharp edge, which is chipped a little, on the outer surface of the wing fold. The wing shoulder is also ridged. The hood is rather short and situated rather low on the crest which is narrow on top. The lateral wall is auriculated in outline with a distinct ridge running about halfway between the crest and the inner posterior corner. The hood notch is shallow and wings are widely spread with lateral wall close together.

The transverse row of the radula is composed of seven teeth. The central tooth has three sharp cusps of which the central one is the most prominent of all. The inner lateral tooth is curved with a rather obtuse tip. The medial lateral tooth is the smallest of all with a low triangular outline. The outer lateral is large and sickle-shaped in outline terminating with a rather sharply pointed tip.

Type series. Holotype specimen (NSMT Mo-59489): Female, 68.0 mm DML, removed from the stomach of a lancetfish measured 1410 mm FL fished at 07°51′S, 88°02.5′E in the central Indian Ocean by the *Sagami-Maru*, August 3, 1975.

Paratype No. 1 (NSMT Mo-59490): Female, 43.5 mm DML, removed from the stomach of a lancetfish measured 850 mm FL fished at 09°15′S, 83°45′E in the central Indian Ocean by the *Sagami-Maru* on July 28, 1975. Paratype No. 2 (NSMT Mo-59491): Female, 57.6 mm DML, removed from the stomach of a lancetfish measured 1390 mm FL fished at 09°21′S, 81°42′E in the central Indian Ocean by the *Sagami-*

Table 1. Measurements and indices of *Onykia rancureli* n. sp.

	Holotype	Paratype No. 1	Paratype No. 2	Paratype No. 3	Mean for 26 specimens
Sex	Female	Female	Female	Female	
Dorsal mantle length (mm)	68.0	43.5	57.6	57.6	22.0–102.9*
MWI	42.5	48.5	41.7	41.7	46.1
HWI	36.8	40.0	35.6	35.6	37.0
FLI	47.1	38.4	46.9	46.9	42.5
FWI	105.3	97.5	100.7	100.7	94.2
I	72.4	52.9	67.7	67.7	59.5
II	86.5	69.0	78.8	78.8	75.6
III	90.0	69.9	81.6	81.6	78.3
IV	82.2	41.1**	77.4	77.4	70.7
TLI	104.3	92.9	101.9	101.9	101.3
CLI	42.6	39.5	42.2	42.2	41.2

* Range. ** The tip mutilated.

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Maru, August 6, 1975. Paratype No. 3 (NSMT Mo-59492): Female, 57.6 mm DML, removed from the stomach of a lancetfish measured 742 mm FL fished at 11°16.2′S, 109°29.5′E in the eastern Indian Ocean by the *Shonan-Maru*, December 25, 1975.

Measurements. See Table 1.

Comparison. This species is distantly larger than *Onykia carribaea* LESUEUR 1821, which is an only species of this genus and is a cosmopolitan epipelagic squid. The original description of *O. carribaea* says it measures "body 1 inch" (LESUEUR 1821). The largest specimen recorded by CLARKE (1966) is 36 mm in mantle length. A specimen measured 43 mm ML reported by OKUTANI (1968) under the name of *Onychia carribaea* apparently belongs to the present new species.

This new species lacks bluish chromatophores which are common to epipelagials. This also differs from *Onykia carribaea* in having less number of marginal suckers in manus (2–4 vs 6), less number of carpal suckers (9 vs 11) and more hooks (10–12 vs 9).

Since OKUTANI (*loc. cit.*) discovered this species from the stomach contents of a scombrid fish, *Euthynnus yaito*, fished in the Kuroshio area, south of Honshu, Japan, RANCUREL (1970) described five speciemens from stomachs of fish including *Alepisaurus ferox* in the southwestern Pacific. The type series in this paper came from stomachs of *A. ferox* taken with tuna longline operated in the central and eastern Indian Ocean. But, additional materials reveal that this new species is widely distributed in the whole range of the Tropical Indian and Pacific Oceans (OKUTANI *et al.*, MS).

Remarks. For the generic name, *Onychia* has been more universally used than *Onykia*. The reader should refer TAKI (1964) for the correct usage of *Onykia*.

Onykia indica n. sp.

(Figs. 10–14)

Description. The body is muscular. The mantle is rather short, conicocylindrical with width being almost half the dorsal mantle length. The dorso-anterior edge of the mantle is nearly straight and a dark streak of the gladius runs along the middorsum from the anterior end of the mantle to the base of the fin. There is a shallow ventral excavation on the free margin of the mantle.

The fins are broadly rhombic, with an apical angle 155°. The fin length is about 40% of dorsal mantle length, while the width exceeds 80%.

The head is cubic in shape with a moderate funnel. The funnel groove is shallow and rather obsoletely demarcated off. The dorsal element of the funnel organ is thin and V-shaped carrying low but sharp carina on both rami. The ventral element of the funnel organ is not always very clear. The funnel element of the mantle-funnel locking apparatus is a simple leaf-shaped cartilage with a shallow, slightly winding groove corresponding to a thin, slender ridge risen from the projections on both sides of ventral excavation of the mantle free margin. The funnel reaches to the level of the posterior one-third of the eye. The nuchal cartilage is elongate quadrate with a

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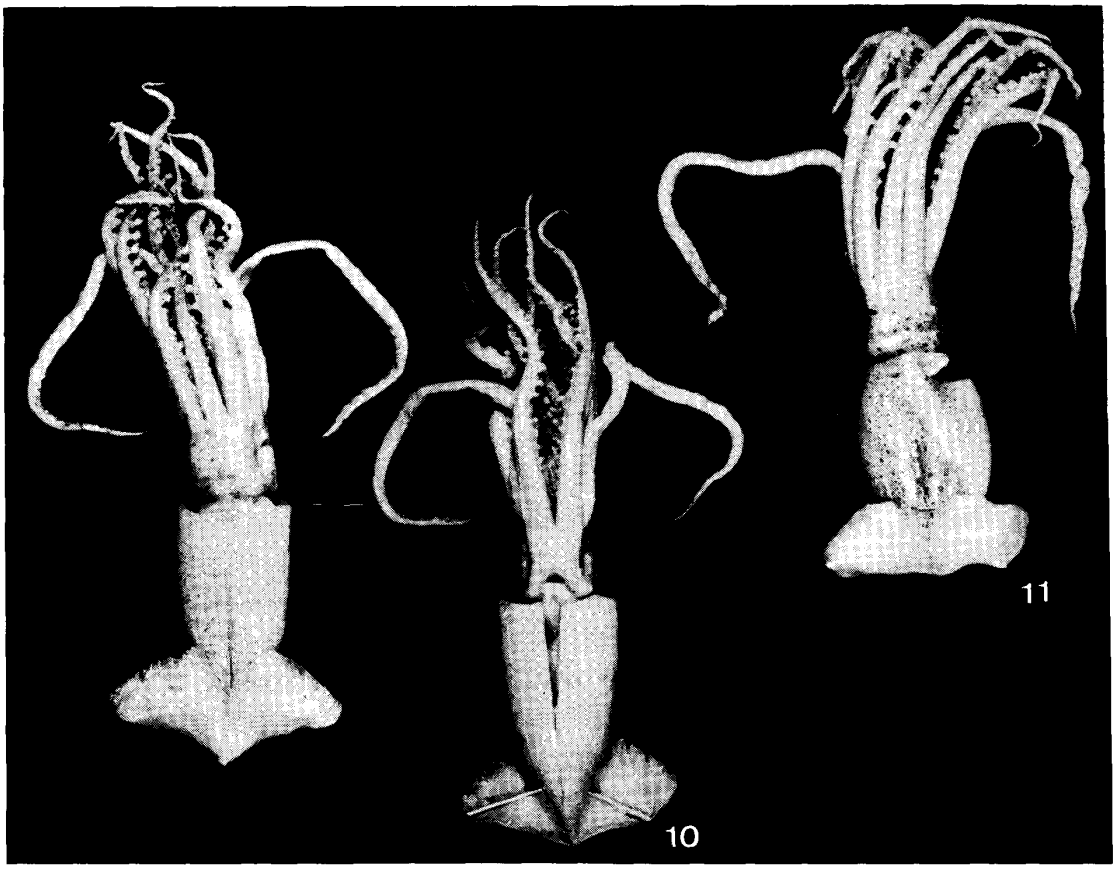

Figs. 10–11. *Onykia indica* n. sp. —— 10. Holotype specimen, dorsal and ventral views (DML= 33.5 mm). —— 11. Paratype No. 1, dorsal view (DML=25.3 mm).

slight winding on both ends. There is a shallow longitudinal groove margined by ridges on both sides.

There is a pair of olfactory crests, one at the posterior corner of the funnel groove and the other just behind the eye. The eye-opening is rather small, quadrate in outline with a sinus in front. The eye-opening is frequently closed by a shrinkage of muscle.

The arms are muscular and slender. The shortest one, the Arm I, is still longer than the dorsal mantle length. The Arms II, III and IV are subequal in length, all taper with a low aboral keel. The arm suckers are all biserial and sparse presenting some 40–50 suckers per arm. The protective membrane along the sucker-bearing surface is rather prominent. The chitinous ring of all arm suckers has no dentition.

The tentacle is also very slender and has barely expanded club. The club has protective membrane along the dorsal margin. The carpus is consisted of seven minute suckers with five to six low fleshy knobs. This part is barely demarcated off as a fixing apparatus. The manus has two rows of hooks, of which the ventral row is slightly stronger than the dorsal one. About 13 hooks present on the ventral row and 12 on the dorsal row. Only 3–4 small marginal suckers exist on both sides of the

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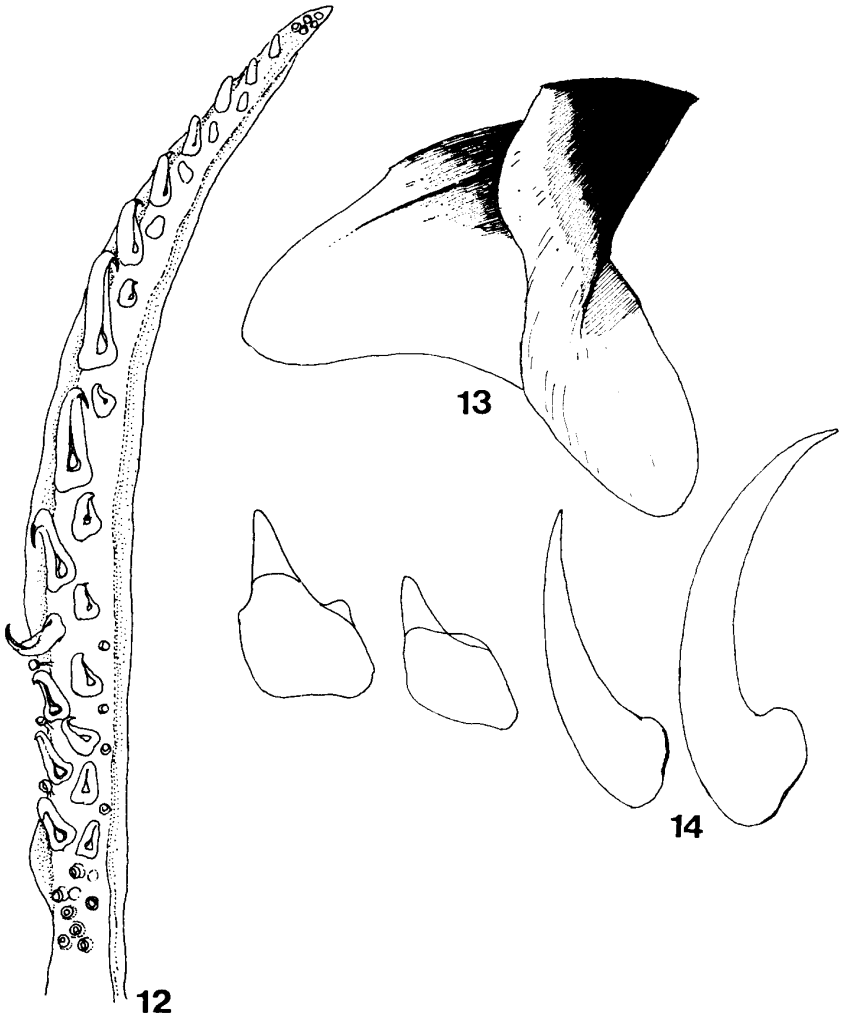

Figs. 12–14. *Onykia indica* n. sp. —— 12. Left tentacle club. —— 13. Lower jaw plate. —— 14. A transverse row of the radula.

proximal part of the manus. There are small but disticnt five suckers present on the dactylus.

The buccal membrane is very broad. The buccal connective attaches to the ventral side of the Arm IV (DDVV-type).

The gladius is lanceolate in general shape, widened at about one-third posteriorly. The end-cone is prominent with a tiny cup ventrally.

The upper jaw plate has a strong rostrum and triangular lateral wall of which the posterior margin is straight. Only the protruded part of the wing just below the jaw angle is stained in an amber color except the hood and rostrum. The hood is apart from the crest.

The lower jaw plate has a small rostral tip and straight cutting edge. The jaw angle is barely hidden by the wing fold which carries a sharp edge on the outer surface. The wing shoulder is darkened a little but the remaining portion of the whole wing is

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Table 2. Measurements and indices of *Onykia indica* n. sp.

	Holotype	Paratype No. 1	Paratype No. 2	Mean for 4 specimens
Sex	Female	Unsexed	Unsexed	
Dorsal mantle length (mm)	33.5	25.3	18.0	18.0–33.5*
MWI	43.0	50.2	56.1	51.1
HWI	37.0	41.5	48.9	42.3
FLI	46.9	41.1	33.3	40.2
FWI	83.6	85.8	73.9	82.1
I	111.3	134.0	111.1	114.1
II	133.1	162.8	150.6	147.8
III	132.2	164.4	148.9	144.8
IV	139.4	171.5	133.3	148.5
TLI	184.5	217.4	185.6	203.0
CLI	65.1	71.5	67.2	71.7

* Range.

not stained. The hood is rather short snd situated rather low on the crest which is rather broadly ridged on top. The lateral wall is auriculated in outline with a ridge running behind and becoming obsolete posteriorly. The hood notch is shallow and both wings are widely spread.

A transverse row of the radula is composed of seven teeth. The central tooth has a rather narrow base with three cusps of which the central one is far taller than low lateral cusps. The inner lateral tooth is subtriangular in shape with two cusps, inner large and the outer small. The medial lateral is tusk-shaped tooth with a sharply pointed tip. The outer lateral is large and sickle-shaped with nicely curved outline and a sharply pointed tip.

Type series. Holotype specimen (NSMT Mo-59493): Female, 33.5 mm DML, removed from the stomach of a lancetfish fished at 11°34′S, 109°45.5′E in the eastern Indian Ocean by the *Shonan-Maru*, December 25, 1975.

Paratype No. 1 (NSMT Mo-59494): Juvenile 25.3 mm DML, removed from the stomach of a lancetfish measured 661 mm FL fished at 12°50′S, 108°53′E in the eastern Indian Ocean by the *Shonan-Maru*, December 17, 1975. Paratype No. 2 (NSMT Mo-59495): Juvenile 18.0 mm DML, removed from the stomach of a lancetfish fished at 09°33′S, 87°39′E in the central Indian Ocean by the *Sagami-Maru*, July 30, 1975.

Measurements. See Table 2.

Comparison. This new species seems to be a small species, but is different from a pygmy species, *Onykia carribaea* LESUEUR 1821, in having a broad fin which is slightly angulated at the end, very long and slender arms, seven carpal suckers, and fewer marginal suckers of the tentacular club. *Onykia japonica* TAKI 1964 may belong to the genus *Moroteuthis* because of a complete absence of marginal sucker on the tentacular club as well as sagittate fin and rough surface of the mantle. There may be no species comparable to the present new species.

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